

# Systems tool is new resource to aid cleanup

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Nearly 50 years of nuclear-materials production at the Hanford Site left more than 700 waste sites with the potential to release contaminants to the soil and groundwater. These sites vary significantly in their inventories of radioactive and chemical contaminants and potential for contaminants to migrate through the soil to the groundwater and the Columbia River.

As decision-makers investigate options for cleaning up and closing Hanford, it's important to understand which waste sites have the most significant impact, and know the cumulative effect of all the waste sites.

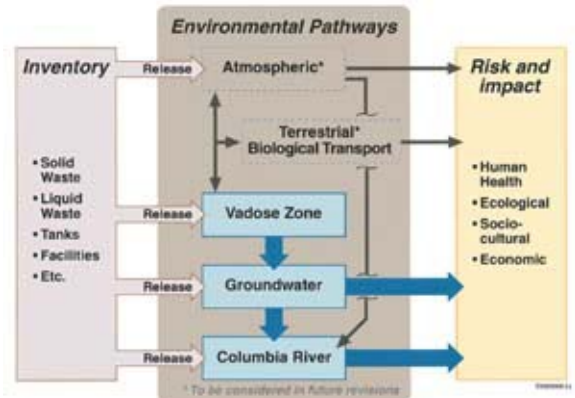
Researchers at the Department of Energy's Pacific Northwest National Laboratory have developed a comprehensive new tool that will provide federal and state regulators with some of the critical information they need to help protect people, the environment and the Columbia River.

The System Assessment Capability, or SAC, is an integrated system of computer models and databases that predicts the movement and fate of contaminants through the vadose zone and the groundwater to the Columbia River. The vadose zone is the soil above the groundwater. SAC also assesses the impact of contaminants on human health, animals and the environment.

Instead of showing each waste site in isolation, as in the past, SAC shows each site in context. "It looks at all the waste sites at Hanford in relationship to one another and how they contribute to future impact," said Bob Bryce, SAC project manager for PNNL. "Using SAC, we can see which waste sites are making the greatest contribution to future impact and clean them up first."

A 14-member team of scientists in fields ranging from civil engineering to zoology developed the two sets of computer models that are at the heart of SAC. One set simulates how contaminants move through the environment. The second set estimates the risks and impacts from those contaminants.

The environmental model is based on a comprehensive inventory of potential contaminants from Hanford operations as far back as 1944. With information about the quantities and concentrations of contaminants at a site, SAC determines how the contaminants will behave. SAC models how a contaminant will discharge to the soil and move to the groundwater, discharge into the groundwater and, finally, enter the Columbia River.



**This conceptual illustration of the System Assessment Capability (SAC) shows a linear flow of information. In general, data flows from the inventory module to the release module, which provides input to the vadose zone, groundwater and river modules. Finally, both the groundwater and river modules provide input to the risk impact modules.**

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SAC models these types of scenarios based on data about the geology, chemistry and hydrology of the site. It also predicts the consequences of these scenarios on the environment and the impact of various cleanup options. "These capabilities will be an important information source to aid decision-makers in prioritizing cleanup of contaminated sites and putting limited funding to best use," Bryce said.

Scientists have tested the validity of SAC by comparing SAC results to known plume migrations at the Hanford Site over time. Researchers are preparing to conduct a composite analysis of the future impacts of remaining waste at Hanford. The results of this study will be considered when future waste-disposal decisions are made at the site. SAC is an integrated part of DOE's Groundwater Protection Program.

Business inquiries about SAC should be directed to Kathryn Lang at 375-3837. ■